

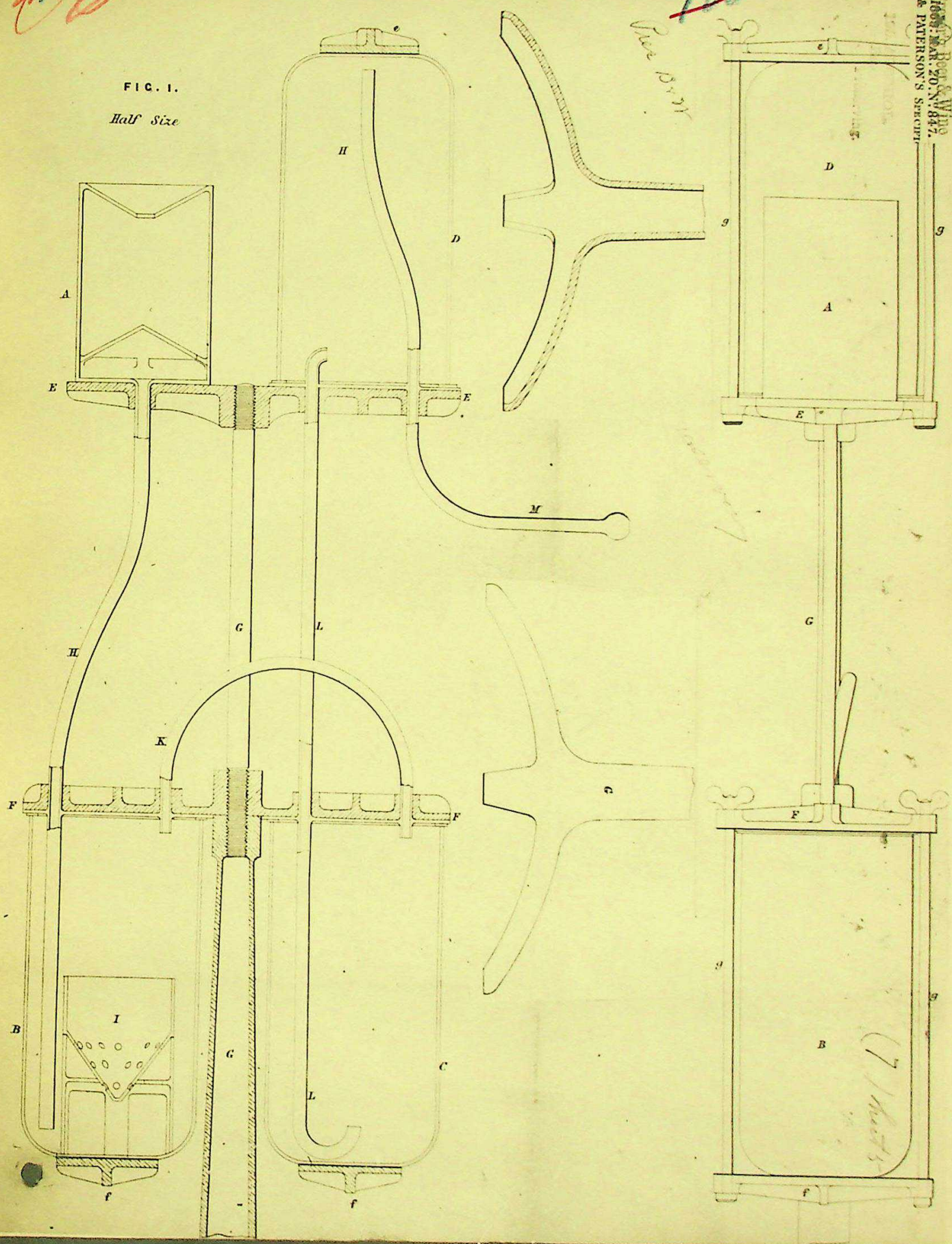
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FIG. 2.
 Half Size

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FIG. 1.
 Half Size



$$\begin{array}{r} 847 \\ \hline 1869 \end{array}$$

A.D. 1869. MAR. 20. No 847.
HAMILTON & PATTERSON'S SPECIM.

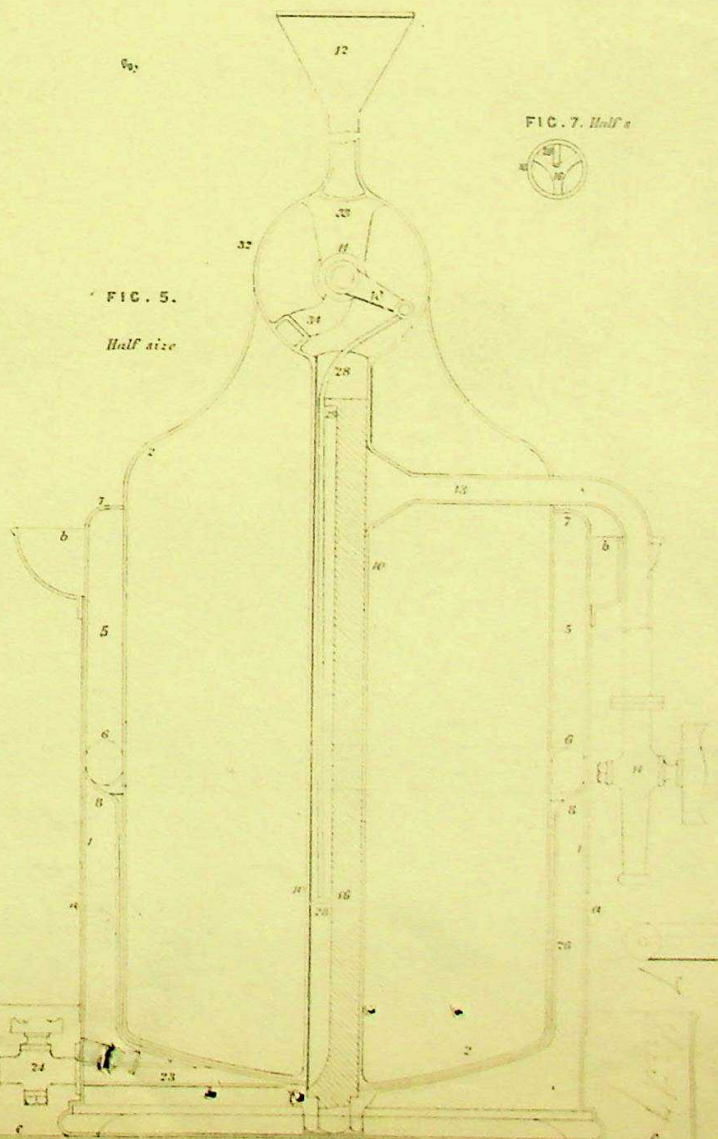
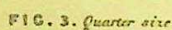


FIG. 7. Half s

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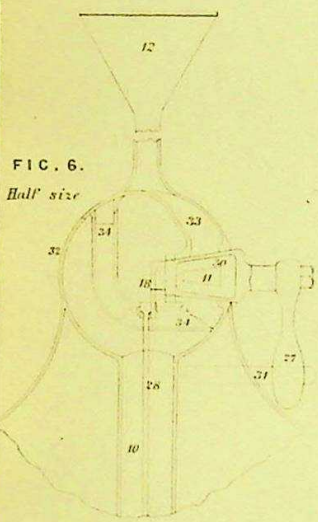
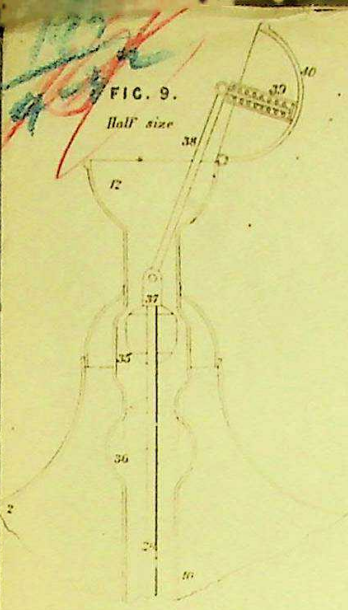
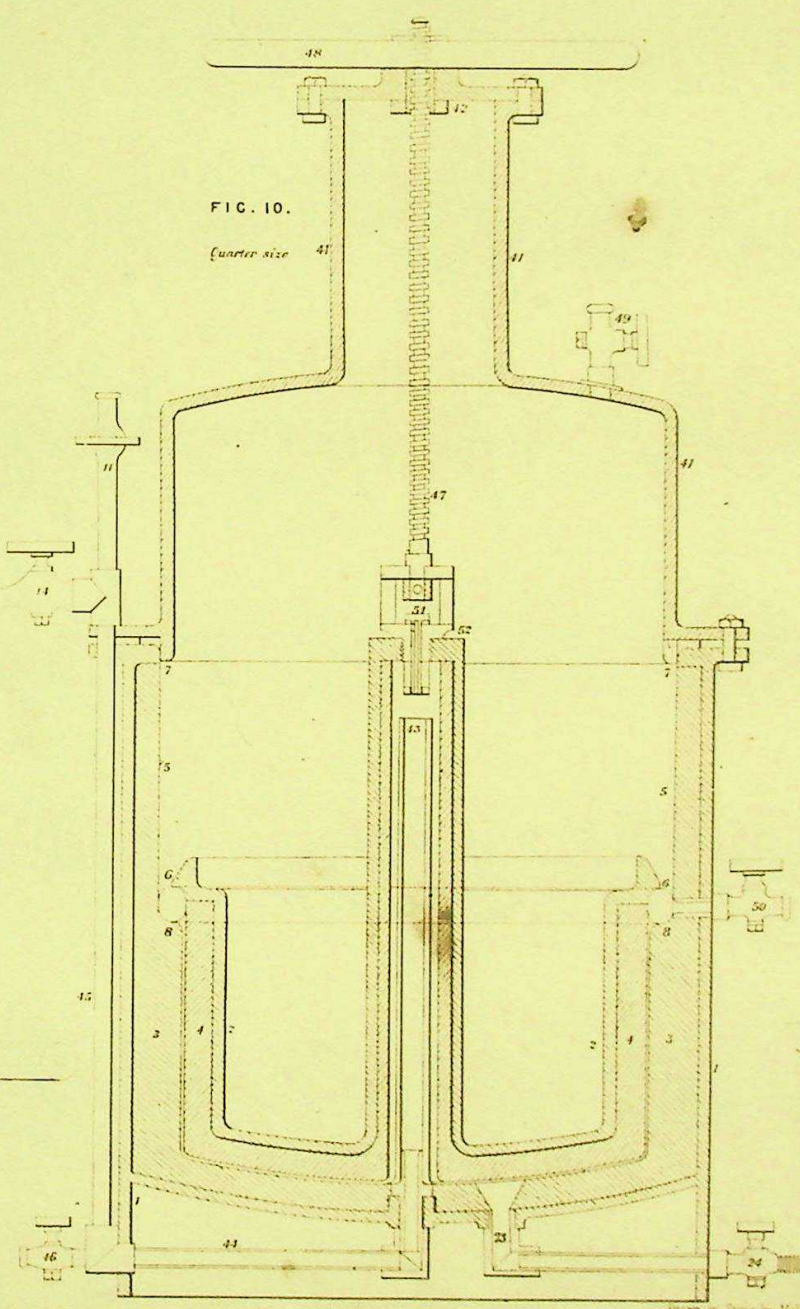
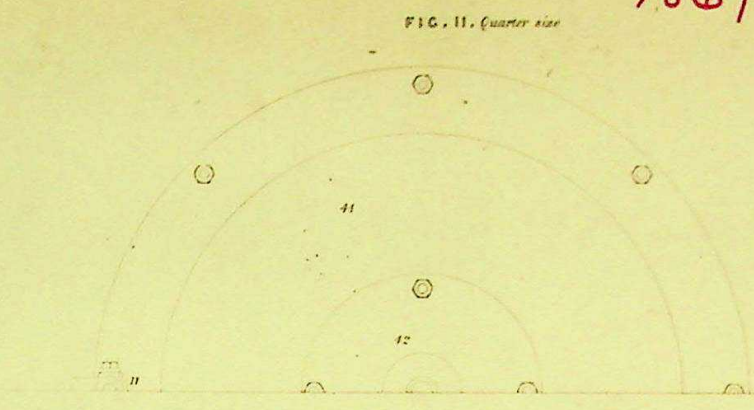


FIG. 8. Half size



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HAMILTON & PATTERSON'S SPECIFIC

186. VICOHOL.
Deep
Freezing

FIG. 13. Third Size

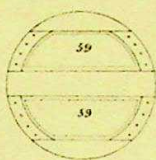


FIG. 12. Third Size

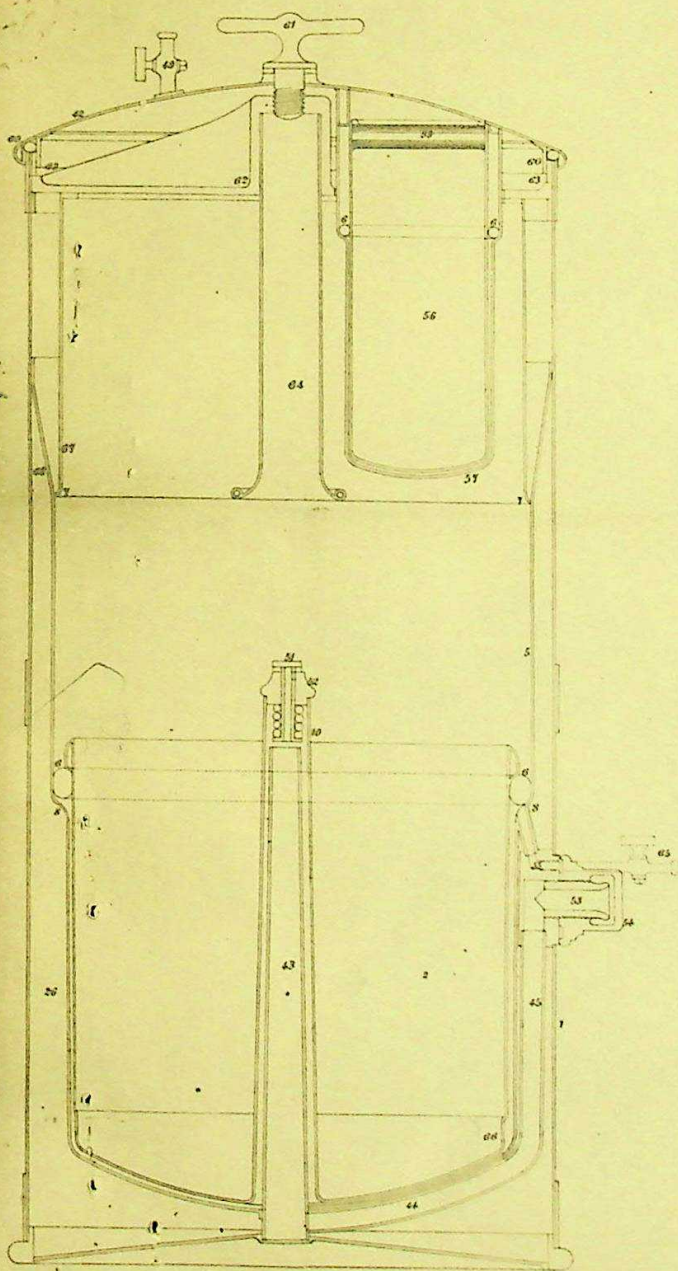
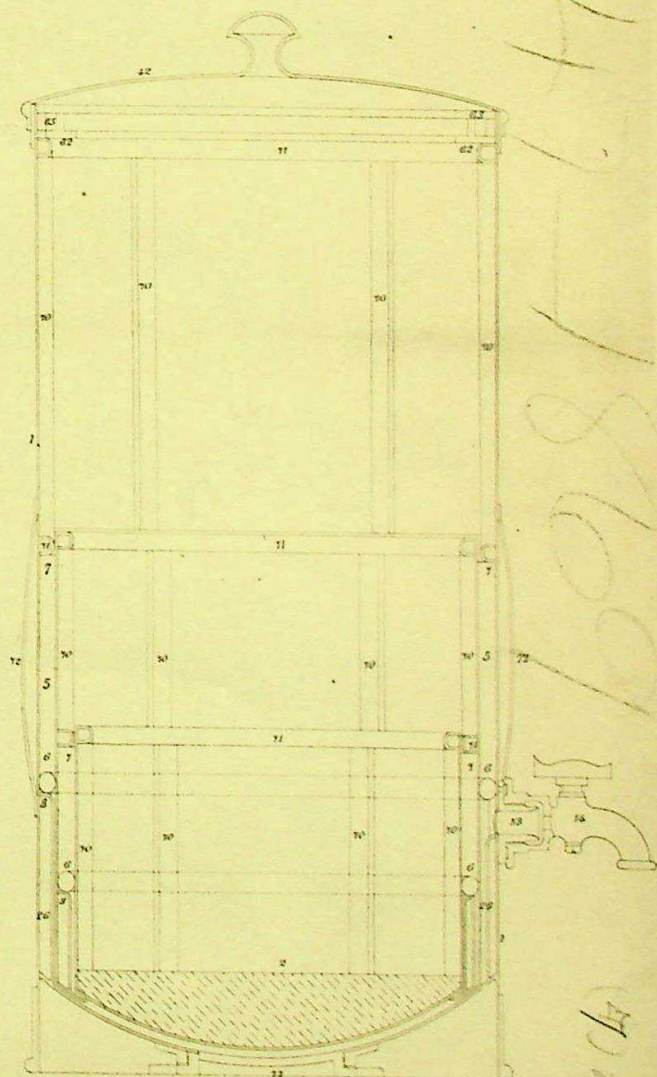


FIG. 14 Quarter Size



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SHEET 3

FIG. 15. Half Size

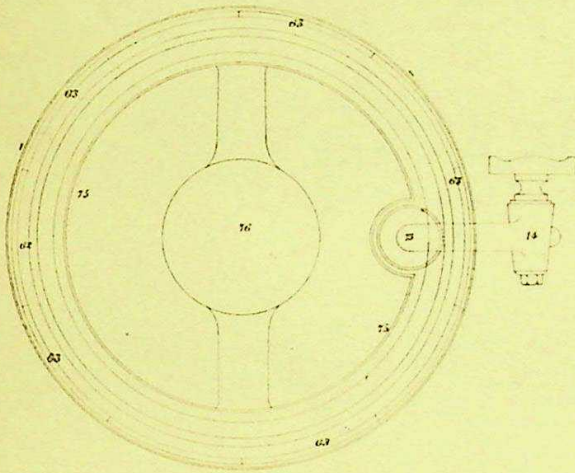
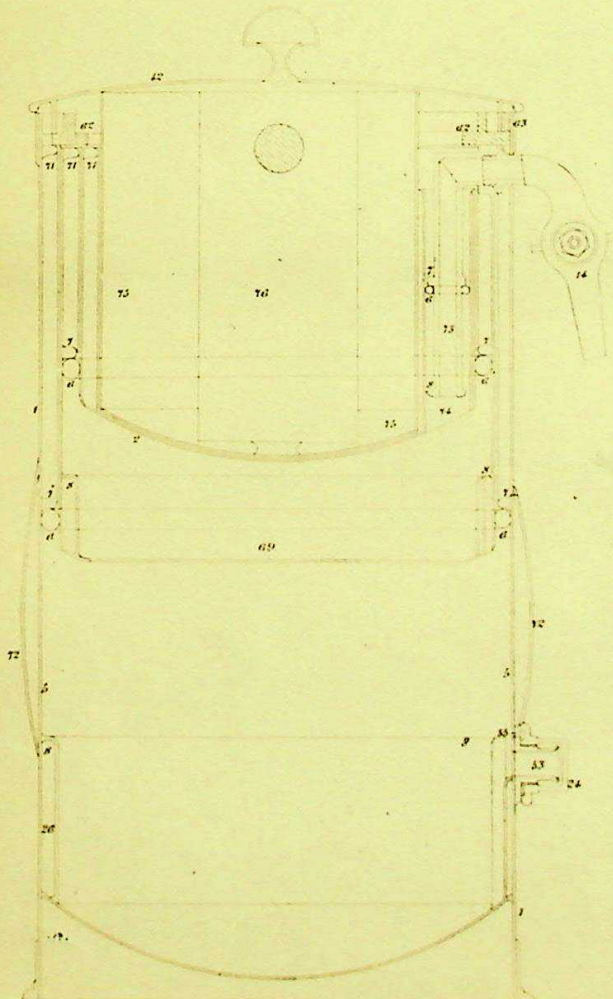


FIG. 16 Half Size



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(7) Sheet 4

(4 SHEETS)
SHEET 4.

Patented

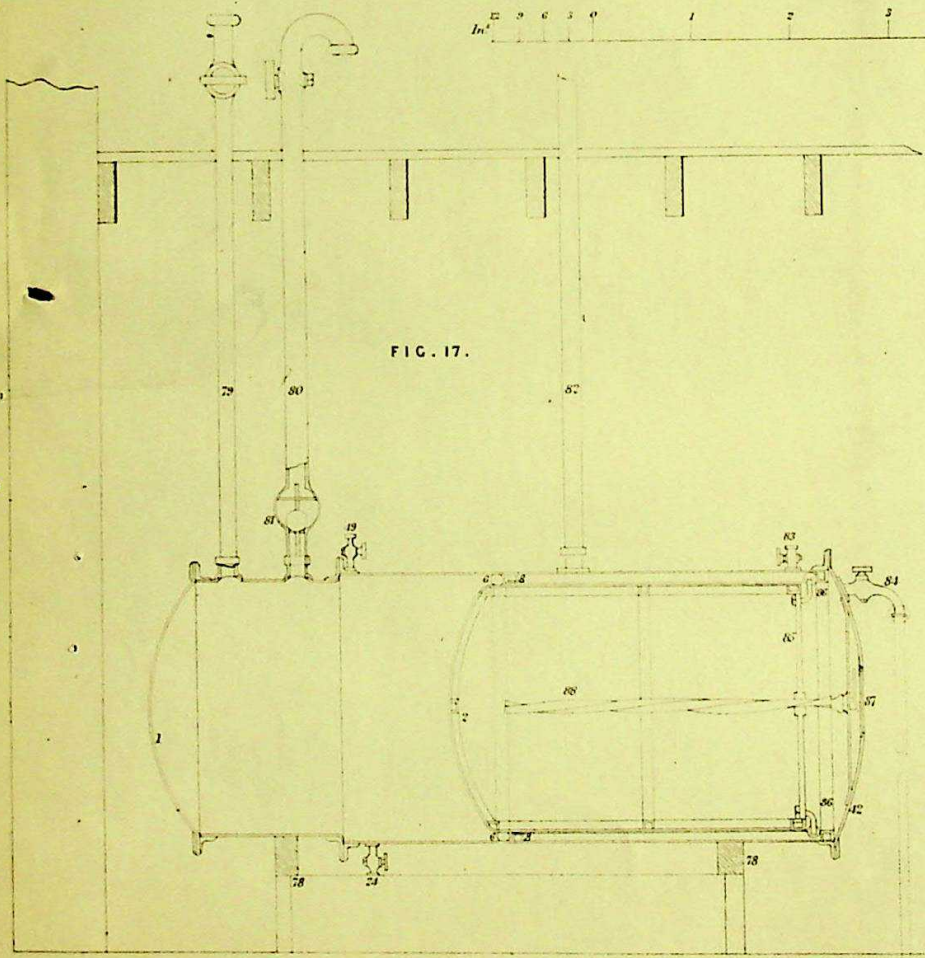


FIG. 17.

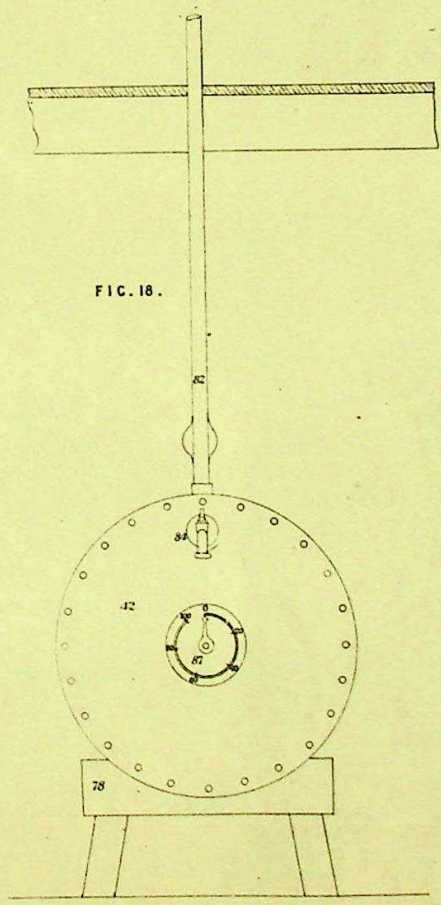


FIG. 18.

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FIG. 19.

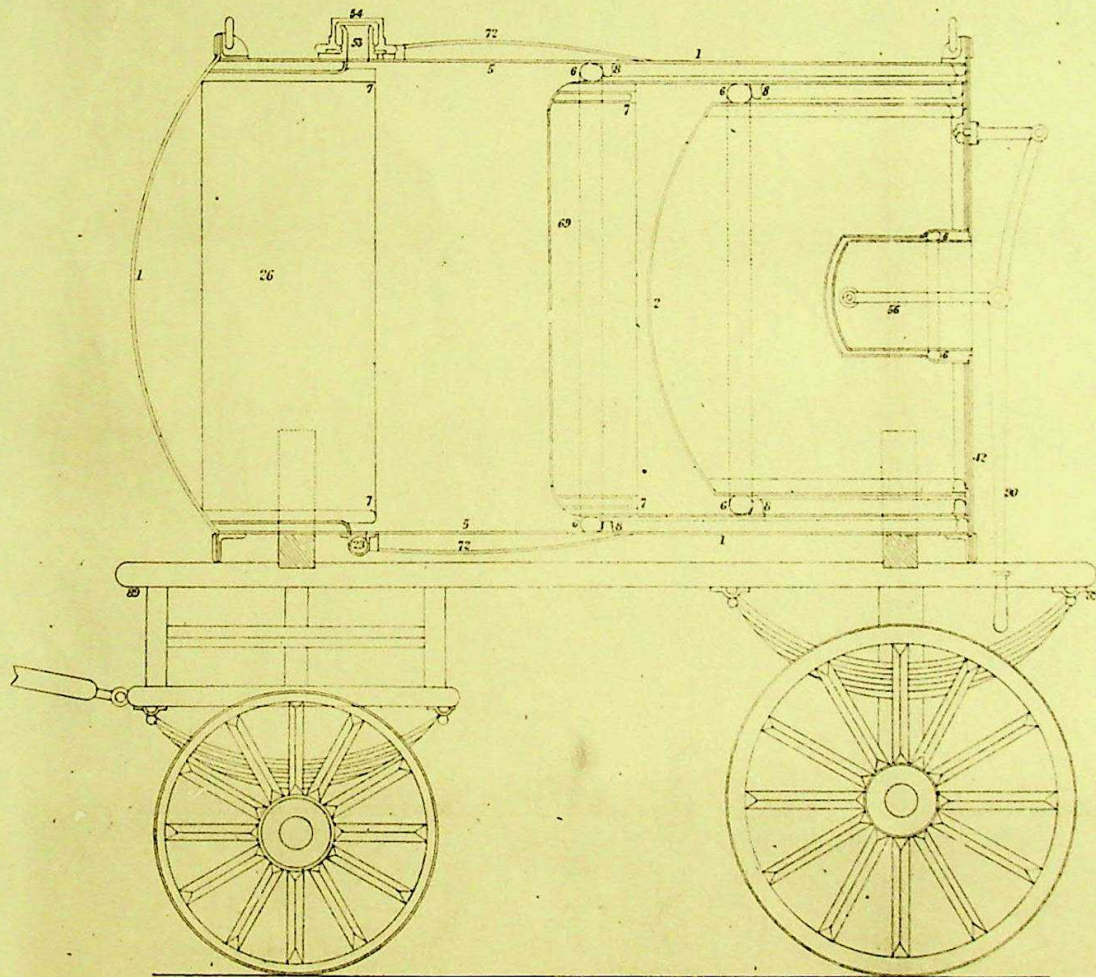
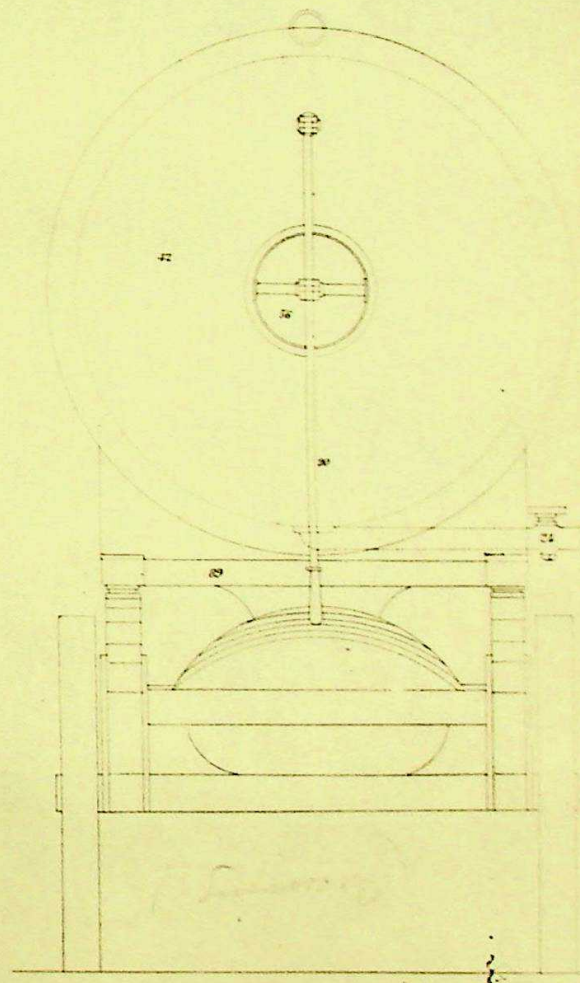


FIG. 20.



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PHOTOGRAPHS

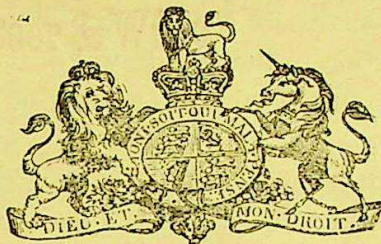
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A.D. 1869, 20th MARCH. N° 847.

Treating Fermentable and Aërated Beverages.

LETTERS PATENT to John Hamilton and Robert Paterson, both of Glasgow, in the County of Lanark, North Britain, for the Invention of "IMPROVEMENTS IN APPARATUS FOR CONTAINING, TREATING, PRESERVING, COOLING, WITHDRAWING, AND CONVEYING FERMENTABLE AND AERATED BEVERAGES."

Sealed the 29th June 1869, and dated the 20th March 1869.

PROVISIONAL SPECIFICATION left by the said John Hamilton and Robert Paterson at the Office of the Commissioners of Patents, with their Petition, on the 20th March 1869.

We, JOHN HAMILTON and ROBERT PATERSON, both of Glasgow, in the County of Lanark, North Britain, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN APPARATUS FOR CONTAINING, TREATING, PRESERVING, COOLING, WITHDRAWING, AND CONVEYING FERMENTABLE AND AERATED BEVERAGES," to be as follows, that is to say:—

10 This Invention comprises various improvements in apparatus for containing, treating, preserving, cooling, withdrawing, and conveying fermentable and aerated beverages.

Hamilton & Paterson's Impts. in Treating Fermentable Beverages.

One modification of the apparatus is designed for supplying carbonic acid gas to casks or other vessels containing beer or similar fermentable beverages just in proportion to the withdrawal of the liquid, whereby the beer will be preserved from the injurious contact of atmospheric air until the vessel is emptied, and will be kept in good condition for a great length of time. Or its condition may be improved by the introduction of carbonic acid gas in this way. The apparatus for supplying the carbonic acid gas in this way comprises four vessels, three of which are tightly closed excepting certain tube connections herein-after referred to. One of the vessels is open, and has hydrochloric or other suitable inexpensive acid put into it, and this acid finds its way down by a tube to the bottom of the second vessel, which latter is placed at a lower level. In the second vessel there is a perforated cup made of lead or other material not acted on by the acid for containing carbonate of lime or other carbonate. On the acid rising high enough in the vessel to reach the carbonate it causes carbonic acid gas to be disengaged, which passes off from the top by a tube leading it to the top of the third vessel. The third vessel is partly filled with water, and communicates by a tube opening near the bottom of the vessel and leading to the lower part of the fourth vessel which is at a higher level. From the top of the fourth vessel a tube leads to the cask or vessel containing the beer, which must be closed as air-tight as possible. When the apparatus is at rest the internal pressure of the gas and the column of water between the third and fourth vessels keep the acid so much out of the second vessel as not to touch the carbonate, and there is no disengagement of gas; but on beer being withdrawn from the cask by a tap the internal pressure thereby becomes reduced, the acid flows into the second vessel so as to reach the carbonate and disengages gas until by the restoration of the pressure it is made to again recede.

In another modification of the improved apparatus a vessel of peculiar construction is used for containing the beer or other beverage. In one form it is a vertical cylinder, but it may be of any convenient horizontal section. A ram or plunger of a corresponding form is fitted to work within it, and a tight connection is made by using what is known as a "rolling packing" ring of rubber. A pipe fixed in the plunger communicates with the interior, and rising up vertically has a stop-cock and funnel at its upper end, whilst a branch with a stop-cock proceeds from a point on it just below the funnel stop-cock for withdrawing the beer or other beverage by. The vessel is filled by the funnel, and on the plunger

Hamilton & Paterson's Impts. in Treating Fermentable Beverages.

rising to a certain position a lever on the stop-cock plug comes into contact with an incline on a part of the framing and is thereby closed. If the plunger rises further from the disengagement of gas after being filled the plug lever encounters a second incline which opens it and allows the
5 excess of gas to escape. Weights are put into or upon the plunger so as to exert on the beer or other beverage a greater than the atmospheric pressure either for improving the condition of the beverage or for causing it to rise up a discharge pipe carried to a higher level than that where the vessel is situated. With the arrangements herein-before described
10 the beverage is withdrawn from its upper surface so that it is always the purest and clearest which comes first, and the withdrawal of a quantity produces no such disturbance as takes place in ordinary casks and arrests the deposit of suspended impurities. The vessel is by preference made to consist of a shell of brass, tinned iron, or other metal lined with
15 Portland cement or other suitable earthen compound. The plunger also consists of a shell of metal with a coating of earthen compound.

The provision herein-before referred to for causing pressure to act on the beverage contained in the vessel admits of carbonic acid gas being injected into the beverage by a pump or otherwise up to a pressure
20 determined by the weights applied, for aerating or improving the beverage. The injection may be effected through a plug hole or tap provided at the bottom of the vessel for withdrawing sediment or dregs. When provision for cooling the beverage is required a covering of cloth is applied round the vessel and gutters are arranged at the top and
25 bottom. The upper gutter is made to nip the cloth, but not so tightly as to prevent water put into it from slowly passing down the cloth and keeping it moist so that the consequent evaporation may have its well known cooling effect. The gutter at the bottom is simply to catch the water dripping from the cloth.

30 The various parts of the apparatus are obviously susceptible of modification. Thus, the plunger may be fixed and the outer vessel be made movable, and when to be used for aerated water or other beverages not liable to deposit impurities the communication for filling and emptying may be made with either the bottom or the top. The pressure may be
35 applied by means of springs instead of weights.

For conveying beverages, as, for example, when taking beer from a brewery to the consumers' premises, a portable collapsable vessel constructed as herein-before described, and of a moderately large size, is

Hamilton & Paterson's Impts. in Treating Fermentable Beverages.

mounted on wheels, and is provided with flexible tubing for delivering its contents in portions as required into collapsable holding vessels or into ordinary casks or barrels in the consumers' cellars.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said John Hamilton and Robert Paterson in the Great Seal Patent Office on the 20th September 1869.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, JOHN HAMILTON and ROBERT PATERSON, both of Glasgow, in the County of Lanark, North Britain, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twentieth day of March, in the year of our Lord One thousand eight hundred and sixty-nine, in the thirty-second year of Her reign, did, for Herself, Her heirs and successors, give and grant unto us, the said John Hamilton and Robert Paterson, Her special licence that we, the said John Hamilton and Robert Paterson, our executors, administrators, and assigns, or such others as we, the said John Hamilton and Robert Paterson, our executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN APPARATUS FOR CONTAINING, TREATING, PRESERVING, COOLING, WITHDRAWING, AND CONVEYING FERMENTABLE AND AERATED BEVERAGES," upon the condition (amongst others) that we, the said John Hamilton and Robert Paterson, our executors or administrators, by an instrument in writing under our, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that we, the said John Hamilton and Robert Paterson, do hereby declare the nature of our said Invention, and in

Hamilton & Paterson's Impts. in Treating Fermentable Beverages.

what manner the same is to be performed, to be particularly described and ascertained in and by the following statement in writing, reference being had to the accompanying Drawings, that is to say:—

Our said Invention comprises various improvements in apparatus for
5 containing, treating, preserving, cooling, withdrawing, and conveying fermentable and aerated beverages.

The first part of the Invention relates to apparatus for supplying carbonic acid gas to casks or other vessels containing beer or similar fermentable beverages; and the second part of the Invention relates
10 mainly to collapsable vessels of a peculiar construction for containing fermentable or aerated beverages.

And in order that our said Invention and the manner of performing the same may be properly understood, we have hereunto appended four Sheets of explanatory Drawings, to be herein-after referred to, there being
15 represented on Sheet 1 of the said Drawings an example of apparatus constructed according to the first part of the Invention, whilst on the other three Sheets are shown some of the numerous modifications of apparatus which may be constructed according to the second part of the Invention.

20 In all the Drawings the same reference letters and numerals are used to mark the same or like parts in all the Figures in which they occur; this method being adopted not only to prevent confusion, but also to allow of repetitions of the descriptions of such parts being dispensed with.

25 Figure 1 on Sheet 1 of the Drawings is a vertical section of our improved apparatus for supplying carbonic acid gas, and Figure 2 is a corresponding elevation of the apparatus as turned one quarter round. This apparatus supplies the gas to casks or other vessels containing beer or similar fermentable beverages just in proportion to the withdrawal
30 of the liquid, whereby the beer will be preserved from the injurious contact of atmospheric air until the vessel is emptied, and will be kept in good condition for a great length of time; or its condition may be improved by the introduction of carbonic acid gas in this way.

The apparatus comprises four vessels A, B, C, D, held by cast-iron
35 plates E, F, fixed upon a standard G, three, B, C, D, of these vessels being tightly closed, excepting certain tube connections herein-after referred to. The three vessels last referred to are by preference of glass, being held firmly, one of them, D, on the top of the plate E, and the

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other two, B, C, against the under side of the plate F by means of separate plates *e, f*, and screwed rods *g*, whilst rubber is interposed at the edges of the glass vessels to make tight joints, and between their ends and the holding plates *e, f*, to avoid breakage. The surfaces of the plates E, F, included within the vessels B, C, D, are lined with lead or other suitable metal not easily acted on by acids, and the various tube connections are passed through and soldered to these linings and are of similar metal. One, A, of the vessels is of lead or other metal not easily acted on by acids, and it is open, and has hydrochloric or other suitable inexpensive acid put into it, and this acid finds its way down by a tube H to the bottom of the second vessel B. In the second vessel B there is a perforated cup I of lead or similar metal for containing carbonate of lime or other carbonate, and on the acid rising high enough to reach the carbonate it causes carbonic acid gas to be disengaged. This gas passes off from the top by a tube K leading it to the top of the third vessel C, which is at starting filled or partly filled with water, and which communicates by a tube L opening near the bottom of the vessel, and leading up to the lower part of the fourth vessel D, which is at a higher level. The gas at first forces the water from the third vessel C by the tube L up to the fourth vessel D, and then bubbles up through the water to the top of the latter vessel, and passes off by a tube M, to the end of which is to be attached the flexible or other pipe leading to the cask or vessel containing the beer. When the apparatus is at rest the internal pressure of the gas and the column of water between the third and fourth vessels C, D, keep the acid so much out of the second vessel B as not to touch the carbonate in the cup I, and there is no disengagement of gas; but on beer being withdrawn from the cask (which cask must be closed as air-tight as possible) the internal pressure thereby becomes reduced, the acid flows into the second vessel B, so as to reach the carbonate, and disengages gas until by the restoration of the pressure it is made to again recede. The pressure of the gas depends on the columns of liquid in the tubes H, L, and upper vessels A, D, and different pressures may be obtained by fitting the upper vessels A, D, at different heights above the lower vessels B, C.

Our improved collapsable vessel for containing and otherwise dealing with fermentable beverages comprises under all its modifications an outer vessel within which there is a ram or plunger in one or more separate lengths, tight connections being made between the vessel and ram and between the separate parts, if any, of the latter by using

Hamilton & Paterson's Impts. in Treating Fermentable Beverages.

in each case what is known as a "rolling packing" ring of rubber. The apparatus may be made of any suitable material or materials, and the vessel may be shaped of any convenient transverse section, having a curved outline, or an outline that is partly curved and partly straight,
5 but without angles. A cylindrical form, that is, one having a circular section, is however the simplest and best, and the one we have adopted in all the modifications shown in the accompanying Drawings. The cylindrical vessel may be placed vertically, horizontally, or in any other convenient position; and either the outer vessel or the ram may be
10 stationary, the other being movable, the first of these arrangements being, however, the more convenient, and the one which we adopt.

We have represented the several modifications as furnished with various accessory details, with reference to which we would here remark that any such detail may be applied when suitable in other modifications
15 besides those in which it is shown.

Modification No. 1 is represented in vertical section in Figure 3 on Sheet 2 of the accompanying Drawings, whilst Figure 4 is a corresponding plan. The outer vessel 1 is a vertical cylinder and has working within it a ram or plunger 2 of a corresponding form. The
20 cylinder consists of a shell of sheet iron or tinned plate lined with Portland cement 3, or other suitable earthen compound, and the ram 2 also consists of a sheet iron shell with a coating 4 of earthen compound. The upper part of the cylinder lining 3 is made thinner than the lower part so as to leave an annular space 5 for the rubber packing
25 ring 6, which is put in in a compressed state. As the ram 2, which is shown in its lowest position, is moved up, the rubber ring 6 rolls between it and the side of the cylinder, maintaining a tight joint throughout. The rubber ring 6 travels half the distance moved through by the ram 6, and its movement upwards is limited by a flange or ring 7 fixed on the
30 top edge of the cylinder, whilst the shoulder 8 of the lining 3 limits its downward movement, whence it follows that its position is corrected every time the ram 2 is moved fully up or down notwithstanding any slight deviations from its proper position when the ram is in intermediate positions. This mode of limiting the travel of the rubber ring 6 by
35 stops, flanges, or shoulders 7, 8, in the cylinder or outer vessel 1 is better than fitting stops for that purpose on the ram 2, as when the vessel is full the outer stop 7 effectually prevents any further outward movement

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of the ring that internal pressure might tend to cause, whereas a corresponding stop on the ram would be inside of or below the ring and could not hold it back. A stop or flange round the inner end of the ram would also prevent the vessel from being as completely emptied as with the arrangement shown. A pipe 9 fixed in the top of the ram 2 5 communicates with the interior of the vessel by a passage 10 extending to the bottom or inner end of the ram, and this pipe 9 rising up vertically has a stop-cock 11 and funnel 12 at its upper end, whilst a branch 13 with a stop-cock 14 proceeds from a point on it just below the funnel stop-cock 11 for withdrawing the beer or other beverage by. The vessel 10 is filled by the funnel 12 and the ram 2 rises as the filling proceeds; its upper end, which is fitted with a cast-iron ring 15 formed with eyes or lugs, is guided by three rods 16, which are fixed at their lower ends in the top of the cylinder 1 and are connected and steadied at their upper ends by a ring or crown 17. On the ram 2 approaching its highest 15 position a lever 18 on the plug of the funnel stop-cock 11 comes into contact with an incline and is thereby closed. This incline is on a cross piece 19 forming part of the crown 17 and shown detached and as projected from Figure 4, the lower side of it being towards the left hand in the Drawing. Two inclines are formed on this cross piece 19, and the 20 pin of the lever 18 first comes in contact with the lower incline at about the point 20, the continued rising of the ram causing it to move to 21 which closes the stop-cock. Then if gas is disengaged from the beverage after it is filled in it causes the ram 2 to rise further, the pin of the lever 18 at length coming into contact with the upper reversed incline, 25 which causes the lever to turn over until the pin reaches perhaps the point 22, when the stop-cock will open and allow the surplus gas to escape. The pressure being thereby relieved the ram will descend and the stop-cock will be closed again. With the arrangements just described the beverage is withdrawn from its upper surface by the stop-cock 14, 30 so that it is always the purest and clearest that comes first, and the withdrawal of a quantity produces no such disturbance as takes place in ordinary casks and arrests the deposit of suspended impurities. If the ram 2 is not itself heavy enough weights or springs must be applied to it to produce the pressure necessary for discharging the contents. An 35 outlet 23 and stop-cock 24 is provided at the bottom of the cylinder 1 for withdrawing sediment or dregs, and this stop-cock may be used for injecting carbonic acid gas by a pump or otherwise for aerating or

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improving the beverage. When the gas is injected in this way a sufficient downward pressure must be applied to the ram 2 by weights or otherwise to meet the internal pressure which it is desired to maintain, and in order to promote the diffusion and proper intermingling of the
5 gas throughout the beverage, a sheet of perforated metal or wire gauze may be placed in the bottom of the cylinder for the gas to pass through and to be thereby subdivided. When filling the vessel it is desirable to remove atmospheric air from the interior as completely as possible, and for this purpose we apply a small float valve 25, the box and tube
10 of which is screwed into the cylinder 1 just above the shoulder or lower stop 8 of the rubber ring 6. On beginning to fill the pressure of the beverage forces out at this valve any air or gas there may be in the interior, and any mixing together of the beverage and air is thus avoided; but as soon as the beverage itself reaches the valve it floats it up and
15 closes it against its upper seat. The valve also prevents the entrance of air should there be a partial vacuum inside, by closing against its bottom seat.

Modification No. 2 is shown in vertical section in Figure 5, whilst a vertical section of the stop-cock details as at right angles to
20 Figure 5 is shown in Figure 6. The cylinder 1 and ram 2 are supposed to be made of pewter and without the lining and coating of cement. The shoulder or bottom stop 8 for the rubber ring 6 is formed on an inner shell 26. A single central rod or bar 16 fixed in the bottom guides the ram 2, which is formed with a central tube 10 working on
25 the bar 16, and also serving as the inlet and outlet for the beverage. Figure 7 is a cross section of the tube 10 and bar 16, and shows how the latter is formed with three grooves for the passage of the beverage. The funnel stop-cock 11 is fitted with an external handle 27 and with a lever 18 internally to be acted upon by the movement of the ram 2.
30 A rod 28 jointed at its upper end to the lever 18 passes down the tube 10 and has a head fixed on its lower end, which on the ram rising eventually comes into contact with a lip or flange 29 formed for the purpose on the upper end of the bar 16 and causes the stop-cock to be closed. When the stop-cock closes in this way neither the ram 2 nor
35 the rubber ring 6 are quite at the upper ends of their strokes, and the ram can rise a little further should gas be disengaged internally, which action will cause the stop-cock lever 18 to be turned down a little further, and this will bring a small hole 30 in the plug into a position

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to allow gas to escape. After the gas escapes a spring 31 fixed externally for the handle 27 to press against returns the stop-cock to its closed position. The stop-cock 11 is constructed in a spherical box 32, in which a passage 33 is formed leading from the bottom of the funnel 12 to the stop-cock, whilst a second passage 34 is formed siphon- 5 wise from the stop-cock to the upper part of the box 32, and has an opening at its top through which the beverage overflows into the box and thence passes down the tube 10. This construction causes the stop-cock 11 to be always full of liquid and the leakage of gas is thereby more completely prevented. 10

This modification (No. 2) of our apparatus is shown as furnished with a provision for cooling the contained beverage. It consists of a covering of cloth *a* shown in red applied round the cylinder 1, whilst a gutter *b* is fixed round the upper part so as to nip the cloth, but not so tightly as to prevent water put into it from slowly passing down and keeping 15 the cloth continually moist so that the consequent evaporation may have its well known cooling effect. The water dripping from the cloth may be caught in a gutter fixed round the bottom or in a dish *c* in which the cylinder is set. The rubber packing ring 6 is shown as solid in all the modifications of apparatus, but it may be made with a small 20 hollow core, as shown separately in Figure 8.

Figure 9 is a vertical section of a valve that may be substituted for the modifications of funnel stop-cock (11) herein-before described. The tube 10 is continued up to a cup or funnel 12 into which the beverage is poured when filling the cylinder, and a little below the cup two 25 enlargements 35, 36, are formed on it. The valve piece is a plug 37 of rubber which fits tightly in the contracted part of the tube between the two enlargements, but when it is in either of them it allows fluid to pass easily. The plug 37 is fixed at the upper end of a rod 28 which is acted on like the corresponding rod described with reference to Figure 5, 30 and this rod is connected by a link 38 to a spring 39 held in the inside of a cap 40 which is hinged to the cup or funnel 12. On the cylinder becoming full the plug 37 is pulled down and closes the passage, and on the cap 40 being turned down the plug is pushed down through the contraction into the position indicated in dotted 35 lines. Then if gas is disengaged it causes the ram to rise, and the plug is thereby pulled down a little further into the lower enlargement

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36, whereupon the gas escapes and the spring 39 afterwards causes the plug to rise again and close the passage.

Modification No. 3 is shown in vertical section in Figure 10, and Figure 11 is a half plan of the top. Both cylinder 1 and ram 2 are strong iron castings, the former having a lining 3 and the latter a coating 4 of cement. A cast-iron head 41 is bolted to the cylinder after the ram and other internal details are introduced, and on the top of this head there is bolted a cover 42, and the whole may in some cases be closed in air-tight. The ram is formed with a central inlet and outlet tube 10, but this tube communicates with the top of a tube 43 which is fixed in the bottom of the cylinder 1, and which is connected by a horizontal branch 44 with a vertical pipe 45 at the side. This side pipe is fitted with three stop-cocks, one 11 being at the top where a flexible pipe may be coupled on for filling in the beverage, a second one 14 being situated a little lower down for withdrawing the beverage, whilst a small one 46 is fitted at the bottom for emptying the pipes 43, 44, 45, when desired. A screw spindle 47 is connected to the top of the central pipe 10 of the ram 2 and passing through the cover 42 is tapped through the eye of a hand wheel 48, by turning which the spindle can be raised or lowered. With these appliances the ram 2 can be made to act like the piston of a pump so as to draw in the beverage from a lower level, if required, or so as to force it out to a higher level. Also if the head 41 is closed air-tight, air or water under pressure may be introduced by a stop-cock 49 into the space above the ram 2 to force the beverage out and to a higher level if required. The stop-cock 49 also serves to regulate the escape of air when the cylinder is being filled. A small stop-cock 50 is applied for letting out any air that may be in the interior when beginning to fill the cylinder. An escape valve 51 is fitted in the top of the central tube 10 of the ram 2 to let out carbonic acid gas when disengaged in the interior, and consists of a small tube working in a hole bored in a piece 52 screwed to the top of the tube 10, and which also serves for the connection of the screw spindle 47. The valve tube has a head at each end, the bottom one being screwed on, and between these heads and the piece 52 there are rubber washers, the lower one being a deep one. When the gas attains sufficient pressure it forces up the tube 51, compressing the lower rubber washer until an aperture in the side of the tube gets outside of the hole in the piece 52, whereupon the gas escapes and the valve afterwards closes.

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Modification No. 4 is shown in vertical section in Figure 12 on Sheet 3 of the accompanying Drawings. It is supposed to be made of tinned sheet iron but without cement linings. The arrangement of the inlet and outlet passage is to some extent like that of modification No. 3, and the construction, although slightly different, will be easily understood from the Drawing. A nozzle 53 is fitted to the vertical side pipe 45, and can be closed by a screw cap 54, which is arranged so as also to close an outlet 55 for air. When filling, the vessel is laid on its side with the nozzle 53 uppermost, and a flexible pipe is applied to the nozzle. For withdrawing the beverage a stop-cock 14 is screwed on the nozzle (as shown in Figure 14) in place of the cap 54. This modification is designed for using compressed air above the ram 2, and a simple pump 56 for compressing the air is fixed in the cover 42. This pump comprises a hollow plunger 56 working in a barrel 57 and fitted with a handle 58, the valves being arranged upon the bottoms of the plunger and barrel, as shown in the inverted plan Figure 13, whilst a "rolling packing" ring 6 is applied between the plunger and barrel. For the valves two strips 59 of parchment or rubber are fixed across the under side of the bottom of the plunger or barrel, the parts whereof under the strips included within the dotted lines are perforated with small holes. When the air presses downwards it passes through the perforations and escapes from under the parchment strips, but when pressing upwards the strips close the perforations. The cover 42 is made tight by a rubber ring 60 and is held by a screw 61, which is tapped into the central boss of a frame piece 62, and this last is held by segmental catch pieces 63 fixed just inside the rim of the cylinder, its periphery being notched or indented so that it can be entered under them after the manner of a bayonet joint. A tube 64 is fixed in the boss of the frame piece 62 to serve as a guide for the central tube 10 of the ram which enters up it when the ram rises. When filling this modification of the apparatus a tube with stop-cock, such as is indicated by dotted lines at 65, is screwed into the air outlet 55, and the stop-cock is opened on beginning to fill, at the same time the stop-cock 49 in the cover is closed to prevent the ram 2 from moving until any air is expelled. Then after all the air is expelled the stop-cock of the tube 65 is closed, and the one 49 in the cover is opened or partly opened to regulate the movement of the ram. In this modification one contrivance is shown for facilitating the getting of the rubber ring 6 properly into its place.

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The rubber rings used are of such sizes that each has to be stretched slightly to get it on its ram so that it may fit closely on the ram, whilst each is slightly compressed when in its place between the ram and cylinder. The bottom of the ram 2 at 66 is of slightly reduced diameter, 5 and the rubber ring is put upon that part before introducing the ram into the cylinder. An inner shell 67 fixed to the frame piece 62, the bottom edge of which forms the upper stop or shoulder 7 for the ring, being removed from the cylinder along with the frame 62 and cover 42, the ram is entered with the ring on it, the latter first encountering a 10 conical surface 68 which guides it properly into its place.

Modification No. 5 is shown in vertical section in Figure 14, and in it the ram is made in two parts, the inner part 2 working inside the outer part 69 with a rubber ring 6 between, just as it does in the cylinder itself in the previously described modifications, whilst the outer 15 part 69 works in the cylinder with a rubber ring 6 between in the same way. The apparatus is supposed to be made of tinned sheet iron with hollow longitudinal and circular ribs 70, 71, some of the latter acting as the stops 7, 8, for the rubber rings 6. A strengthening and protecting belt 72 is also fixed externally round the part of the main shell 1 where 20 the outer rubber ring 6 works, and where consequently there cannot be internal ribs or shells. The apparatus is placed on its side when filling. The nozzle 53 communicates directly with the interior of the cylinder, and does not lead the beverage from the top when the apparatus is full; it does so, however, as soon as the contents are down to its level, and 25 then continues to do so until the apparatus is emptied. A groove is formed down the inner shell 26 to allow a free passage when the bottoms of the rams 2, 69, are below the nozzle. The upward movements of the ram 2 and outer ram shell 69 are stopped by a ring 62 (which takes the place of the frame 62 of No. 4, and) which is held by segments 63 30 being notched or indented so as to be got under them. An arm-hole door 77 is screwed into the bottom of the cylinder 1 to admit of the rubber rings 6 being adjusted properly in their places and of the vessel being cleaned.

Modification No. 6 is shown in plan in Figure 15, and in vertical 35 section in Figure 16. It resembles No. 4, but is represented as made of brass, which may be tinned or silvered. In addition to the nozzle 53

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for filling, it has a pipe 73 and stop-cock 14 for withdrawing the beverage, this pipe being fixed to and travelling with the outer ram shell 69, whilst it passes through a slot in the outer cylinder 1 and works in a tube 74 formed for it in the inner ram 2, a "rolling packing" ring 6 of rubber being used to make a tight joint. The concavity in the upper side of the ram 2 forms a convenient receptacle for ice when its use is desired for cooling the beverage, and there is room enough for a considerable quantity of ice in addition to such a weight as will cause the beverage to rise up the pipe 73 and flow out of the stop-cock 14 when it is wished to withdraw it. When applying ice in this way we prefer to put it in a portable dish or pan 75 made to easily fit in the ram 2, and the weight 76 is fixed in this dish by arms serving as handles, whilst it touches the bottom only at the centre so that the water from the ice has access over as much surface as possible. When a quantity of ice is all melted the dish is lifted out to empty the water and to be filled with fresh ice. In the plan Figure 15 the cover 42 is supposed to be removed, and shows the notched ring 62 and holding segments 63 which stop the ram 2 and shell 69 at the tops of their strokes.

Modifications Nos. 1, 2, 3, 4, 5, are represented as collapsed or empty, but No. 6 is shown expanded or with the ram 2 and shell 69 in the positions they assume when the vessel is full.

Modification No. 7 is shown in longitudinal vertical section in Figure 17 on Sheet 4 of the accompanying Drawings, and in end elevation in Figure 18. It is supposed to be made of tinned sheet iron of simple construction, with a single ram 2, and is adapted for large sizes and to be permanently on its side. It is supposed to be in a cellar upon a gauntree 78, and pipes connected to it are led to a floor above, one 79 for filling it by, a second 80 for drawing off the beverage by, and fitted with a float valve 81 to prevent air from entering whilst filling in the beverage; whilst a third 82 is for conveying water to it from a cistern, or compressed air from a pump to force the ram so as to expel the beverage up the pipe 80. A stop-cock 83 is also applied for letting off the air whilst filling in the beverage, and another stop-cock 84 is provided for the escape of water when filling in the beverage; and on this last a length of tubing may be coupled and led down to form a suction head of water that will draw in the

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beverage from even a lower level. The open end of the ram 2 is strengthened by a frame 85 with radial arms, and it is supported and steadied by antifriction rollers 86 carried by the arms. The apparatus is represented as furnished with an indicator to show at any time the
 5 quantity of beverage it contains. A glass dial 87 with a scale marked on it is fitted in the end of the cylinder, and an index is fixed on the end of a twisted rod 88, which is held so that it can turn in a cross bar fixed to the cylinder end, whilst it passes through a central twisted eye in the frame 85 of the ram 2. The longitudinal movement of the
 10 ram 2 turns the rod 88 and index in consequence of the twist and thus indicates its position at any time.

Modification No. 8 (and last) is shown in vertical section in Figure 19, and in end elevation in Figure 20, and consists of a cylinder 1 and accessories somewhat like No. 5 placed horizontally on a wheeled
 15 wagon frame 89. This forms a convenient portable apparatus for conveying beverages, as, for example, when taking beer from a brewery to the consumers' premises, and is to be provided with flexible tubing which may be coupled upon the nozzle 53 for delivering the contents in portions as required into collapsable holding vessels or into ordinary
 20 casks or barrels in the consumers' cellars. It is furnished with an air pump 56 and hand lever 90 for working it, whereby a pressure may be applied to the ram 2 for controlling its movement when filling the vessel or for expelling the beverage along tubing even to a somewhat higher level.

25 Having thus particularly described our said Invention, and the manner in which the same is to be performed, we have to state that we do not restrict ourselves to the precise details herein described or delineated, but that what we believe to be novel and original, and claim as the Invention secured to us by the herein-before in part recited Letters
 30 Patent is,—

1. The constructing or arranging of apparatus for supplying carbonic acid gas to vessels containing fermentable or aerated beverages, substantially in the improved manner herein-before described.

And, 2. The applying, adapting, and using of collapsable vessels constructed, furnished, and working in any of the modes herein described
 35

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or delineated, or substantially so, for containing, treating, preserving, cooling, withdrawing, or conveying fermentable or aerated beverages.

In witness whereof, we, the said John Hamilton and Robert Paterson, have hereunto set our hands and seals, this Sixteenth day of September, in the year of our Lord One thousand eight hundred and sixty-nine.

JOHN HAMILTON. (L.S.)

R. PATERSON. (L.S.)

Witness,

EDMUND HUNT,
Patent Agent,
Glasgow.

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